1. Rejection of Claims 1-3, 6, 7 and 10-11 under 35 USC 103

Claim 1 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Jeng, et al (U.S. 5,789,270) (hereinafter "Jeng") in view of Watanabe, et al. (U.S. 6,274,408 B1) (hereinafter "Watanabe"). The rejection is traversed because the rejection is based on an improper combination of references.

The Examiner admits that Jeng does not teach Claim 1's feature of " a plurality of electrically isolated, encapsulated members, wherein each said member extends from a perimeter of the package body toward the plate and overhangs the periphery of the plate and is in a connection with the plate." The Examiner cites Watanabe as disclosing this feature in Figures 6-7. Watanabe shows support bars 6 that overhang and are coupled to heat sink 4. See Col. 4, lines 14-24.

However, modifying Jeng's structure by inserting Watanabe's support bars 6 would render Jeng's structure unsatisfactory for its intended purpose, and would change the principle of operation of Jeng's structure., because Jeng would no longer have means to support the paddle 58 and heat sink 50. Accordingly, the combination of Jeng and Watanabe is impermissible. See MPEP Section 2143.01.

In particular, Jeng's die paddle 58 is essential to his invention because it supports heat sink 50. Jeng's Abstract communicates this point clearly:

> A method of assembly an integrated circuit die to a heat sink by first providing a lead frame that has a die-attach paddle portion having a top surface, a bottom surface, and an opening therethrough, positioning a heat sink having a raised portion on its top surface abutting the bottom surface of the die-attach paddle portion, and then frictionally engaging the hat sink and the die-attach paddle together and bonding an integrated circuit chip to the top surface of the heat sink with an adhesive material sandwiched therein between such that the assembly can be placed in a mold apparatus for forming a plastic encapsulated package.

Note that Jeng's die paddle 58 is supported at its four corners by tie bars 60. See Fig. 5 and Col. 4, lines 61-64.

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The Examiner's modification of Jeng's structure entails a substitution of Watanabe's support bars 6 into Jeng's leadframe. However, this would result in a removal of Jeng's tie bars 60, which, just like Wantanabe's support bars 6, are at the four corners of the leadframe. Without tie bars 60, Jeng's die paddle 58 would be unsupported, and hence would not be able to support Jeng's heat sink 50. This is a requirement of Jeng's invention. Accordingly, the Examiner's proposed modification would render Jeng's structure inoperable and would change its principle of operation. Hence, the rejection must be withdrawn. See MPEP Section 2143.01.

Claims 2, 3, 6, 7, 10 and 11 depend from Claim 1 and are therefore allowable as depending from an allowable independent claim.

2. Rejection of Claims 12-14, and 16-20 under 35 USC 103

Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Jeng in view of Watanabe. Claim 12 recites the feature that "at least a plurality of leads increase in width as those leads extend from the frame toward the central region." The Examiner did not address this feature of Claim 12.

It is submitted that the rejection of Claim 12 is a mistake. In particular, the feature of Claim 12 quoted above is in Claim 21, which the Examiner indicated was allowable. Claim 12 should be allowable for the same reasons as Claim 21.

Claims 13, 14 and 16-20 depend from Claim 12 and are therefore allowable for at least the same reasons as Claim 12.

3. Objection to Claims 21-28

Claims 21-28 were acknowledged by the Examiner as containing allowable subject matter, but were objected to as depending from a rejected base claim. Claims 21-28 each depend from Claim 1 or Claim 12, and are submitted to be allowable in their present form for the reasons given above for Claims 1 and 12.

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CONCLUSION

Claims 30-43 are allowed. The remaining claims are submitted to be allowable.

Please direct questions or comments to the undersigned at 408 487-1315.

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Appendix of Pending Claims

1. A semiconductor package comprising:

a semiconductor chip;

a package body formed of a hardened encapsulant material;

a plurality of metal leads, wherein each lead is electrically connected to the chip;

a flat metal plate fully encapsulated within said package body, wherein the chip is mounted on the plate and an encapsulated first portion of each of the leads overhangs a periphery of the plate; and

a plurality of electrically isolated, encapsulated members, wherein each said member extends from a perimeter of the package body toward the plate and overhangs the periphery of the plate and is in a connection with the plate.

2. The package of claim 1, wherein the plate is comprised of copper and has a CuO or Cu_20 film on all surfaces thereof.

3. The package of claim 1, wherein an electrically insulative, thermally conductive adhesive layer is attached between the first portion of the leads and the plate, and said layer is covered by said encapsulant material.

6. The package of claim 1, wherein each said member extends from a corner of the perimeter of said package body.

7. The package of claim 1, wherein the metal plate is connected to said members by an electrically insulative, thermally conductive adhesive layer.

10. The package of claim 1, wherein the metal plate has a thickness that is at least two times a thickness of said leads.

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11. The package of claim 1, wherein the encapsulant material is between said plate and the first portion of the leads.

12. A leadframe comprising:

a metal frame including a central region within the frame;

a plurality of metal leads extending from a first end integral with the frame to a second end adjacent to the central region, wherein at least a plurality of the leads increase in width as those leads extend from the frame toward the central region; and

a flat metal plate supported in the central region, wherein a first portion of each said lead overhangs a periphery of said plate.

13. The leadframe of claim 12, wherein the plate is comprised of copper and has a CuO or Cu_20 film on all surfaces thereof.

14. The leadframe of claim 13, wherein an electrically insulative, thermally conductive adhesive layer is attached between the first portion of the leads and the plate.

16. The leadframe of claim 12, further comprising a plurality of members extending from said frame adjacent to said leads, wherein each said member overhangs the periphery of the plate and is in a connection with said plate.

17. The leadframe of claim 16, wherein each said member extends from a corner of said frame.

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18. The leadframe of claim 16, wherein the metal plate is connected to said members by an electrically insulative, thermally conductive adhesive layer.

19. The leadframe of claim 16, wherein each connection is a metal to metal connection between the plate and the respective member.

20. The leadframe of claim 16, wherein the metal plate has a thickness that is at least two times a thickness of said leads.

21. The package of claim 1, wherein at least a plurality of the leads increase in width as those leads extend from the perimeter of the package body toward the plate.

22. The package of claim 21, wherein two leads of increasing width are adjacent and extend from opposite sides of a first corner of the perimeter of the package body, said two leads defining a first slot between them, said first slot extending from the first ends of the two leads to their respective second ends and filled with the encapsulant material.

23. The package of claim 22, further comprising a short tapered metal first member located at the first corner of the perimeter of the package body and extending into the first slot for only a portion of a length of the first slot.

24. The package of claim 1, wherein three of said plurality of encapsulated members each extend diagonally from a first end located at a second corner, a third corner, and a fourth corner, respectively, of the perimeter of the package body to a second end overhanging the periphery of the plate.

25. The leadframe of claim 12, wherein two leads of increasing width are adjacent and extend from opposite sides of a first corner of the frame, said two leads defining an open first slot between them, said first slot extending from the first ends of the two leads to their respective second ends.

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26. The leadframe of claim 25, further comprising a short tapered metal first member integral with the first corner of the frame and extending into the first slot for only a portion of a length of the first slot.

27. The leadframe of claim 12, further comprising three metal pseudo tie bars each extending diagonally from a first end integral with a second corner, a third corner, and a fourth corner, respectively, of the frame to a second end overhanging the periphery of the plate.

28. The leadframe of claim 27, wherein each pseudo tie bar includes a first portion at the second end overhanging the periphery of the plate, a second portion adjacent to the first end integral with the respective corner of the frame, and a third portion between the second portion and the first portion, wherein the second portion is wider than the third portion and has edges that taper into the third portion.

29. The leadframe of claim 19, wherein each said metal to metal connection is between the respective member and a protrusion from a surface of the plate, and the protrusion is stamped or swaged against the respective member to form the metal to metal connection.

30. A semiconductor package comprising:

a semiconductor chip;

a package body formed of a hardened encapsulant material;

a plurality of metal leads, wherein each lead is electrically connected to the chip;

a flat metal plate fully encapsulated within said package body, wherein the chip is mounted on the plate, and an encapsulated first portion of each of the leads overhangs the periphery of the plate, and the plate has a thickness that is at least two times a thickness of the leads; and

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a plurality of encapsulated members, wherein each said member extends from a perimeter of the package body toward the plate, and overhangs a periphery of the plate, and is in a metal to metal connection with a surface of the plate.

31. The package of claim 30, wherein an electrically insulative, thermally conductive adhesive layer is attached between the first portion of the leads and the plate, and the adhesive layer is covered by the encapsulant material.

32. The package of claim 30, wherein the encapsulant material is between said plate and the first portion of the leads.

33. The package of claim 30, wherein a protrusion of the flat metal plate is stamped or swaged against the respective member, thereby forming the metal to metal connection.

34. The package of claim 30, wherein at least a plurality of the leads increase in width as those leads extend from the perimeter of the package body toward the plate.

35. A semiconductor package comprising:

a semiconductor chip;

a package body formed of a hardened encapsulant material;

a plurality of metal leads each electrically connected to the chip, wherein at least a plurality of the leads increase in width as those leads extend from a perimeter of the package body, and wherein two leads of increasing width are adjacent and extend from opposite sides of a first corner of the perimeter of the package body, said two leads defining a first slot between them, said first slot extending from the first ends of the two leads to their respective second ends;

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a flat metal plate fully encapsulated within said package body, wherein the chip is mounted on the plate, and an encapsulated first portion of each of the leads overhangs a periphery of the plate, and the plate has a thickness that is at least two times a thickness of the leads;

a metal first member located at a first corner of the package body and extending into the first slot for only a portion of a length of the first slot, the first member being encapsulated by the package body and including intersecting straight edges that taper to a point aligned with a central axis of the first slot; and

three metal pseudo tie bars each extending diagonally from a first end located at a second corner, a third corner, and a fourth corner, respectively, of the perimeter of package body to a second end overhanging the periphery of the plate and each being in a connection with the plate.

36. The package of claim 35, wherein each pseudo tie bar includes a first portion at the second end overhanging the periphery of the plate, a second portion adjacent to the first end located at the respective corner of the perimeter of the package body, and a third portion between the second portion and the first portion, wherein the second portion is wider than the third portion and has edges that taper into the third portion.

37. (Amended) A leadframe comprising:

a metal frame including four corners and a central region within the frame;

three metal pseudo tie bars each extending diagonally from a first end integral with a second corner, a third corner, and a fourth corner, respectively, of the frame to a second end adjacent to the central region;

a plurality of metal leads each extending from a first end integral with the frame to a second end adjacent to the central region, wherein at least a plurality of the leads increase in width as those leads extend from the frame toward the central region, and wherein two leads of increasing width are adjacent and extend from opposite sides of a first corner of the frame, said two leads defining an open first slot between them,

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said first slot extending from the first ends of the two leads to their respective second ends; and

a flat metal plate supported in the central region, wherein the plate has a thickness that is at least two times a thickness of said leads, and wherein a first portion of each said lead overhangs a periphery of the plate, and wherein a first portion of each said pseudo tie bars overhangs the periphery of the plate and is in a connection with the plate.

38. The leadframe of claim 37, wherein an electrically insulative, thermally conductive adhesive layer is attached between the first portion of the leads and the plate.

39. The leadframe of claim 37, wherein each of the connections between the plate and the first portions of the tie bars comprises an electrically insulative, thermally conductive adhesive layer.

40. The leadframe of claim 37, wherein each of the connections between the plate and the first portions of the tie bars comprises a metal to metal connection.

41. The leadframe of claim 37, wherein said first slot is between two pair of adjacent leads of increasing width, wherein each said pair includes one of the two leads defining the first slot, and wherein the two adjacent leads of each said pair define an open second slot between them, and each of the second slots has a width, and the width of the second slots each are less than the width of the first slot.

42. The leadframe of claim 37, wherein the first slot increases in width and then decreases in width from the frame toward the central region.

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43. The leadframe of claim 37, further comprising a short tapered metal first member integral with the first corner of the frame and extending into the first slot for only a portion of a length of the first slot.

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